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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,669	03/26/2001	George J. Hudak	10003916-1	9797

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AGILENT TECHNOLOGIES, INC.
Legal Department, 51U-PD
Intellectual Property Administration
P.O. Box 58043
Santa Clara, CA 95052-8043

EXAMINER	
MACCHIAROLO, PETER J	
ART UNIT	PAPER NUMBER
2875	

DATE MAILED: 10/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/817,669	HUDAK, GEORGE J.	
	Examiner	Art Unit	
	Peter J Macchiarolo	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 9, 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamoto (USPN 5,086,255).

In regards to claim 9, Okamoto discloses in figure 1 a method of cooling a gas discharge tube having an outer surface (element 70); and passing an air flow over at least a portion of the outer surface of the gas discharge tube (element 60). Okamoto further teaches in column 4 lines 3-14, a method in which at least the above elements are needed in order to efficiently cool the discharge tube using air.

In regards to claim 12, Okamoto discloses all of the recited limitations of claim 9 (above). Okamoto also discloses in figure 1 a method further comprising powering the gas discharge tube with microwave energy (element 150).

In regards to claim 13, Okamoto discloses in figure 1, a gas discharge tube (element 70); a power source for providing energy to the gas discharge tube (element 150); and an apparatus for air-cooling the gas discharge tube (element 51).

In regards to claim 14, Okamoto discloses all of the recited limitations of claim 13 (above). Okamoto also discloses in figure 1 a detector further wherein the discharge is powered by microwave energy (element 150).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. (USPN 5,086,255) in view of Ahonen (USPN 5,216,330).

In regards to claim 10, Okamoto discloses all the limitations of claim 9 (above).

However, Okamoto is silent to the method of cooling a gas discharge tube further comprising generating the flow of air by an on board air pump.

However, Ahonen teaches in figure 2 a method of cooling a gas discharge tube wherein the air source is an on board fan, and the fan cools not only the discharge tube, but also cools other internal components, adding to the overall lifetime of the entire device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to devise Applicant's method according to claim 9 (above), further comprising generating the flow of air by an on board air pump, because these two cooling means are art-recognized equivalents. In the instant case, one of ordinary skill in the art would have

found it obvious to substitute a fan for an air pump because both cooling means are capable of providing sufficient airflow to the gas discharge tube.

In regards to claim 11, Okamoto discloses all the limitations of claim 9 (above).

However, Okamoto is silent to the method of cooling a gas discharge tube further comprising generating the flow of air by a central compressor.

However, Ahonen teaches in figure 2 a method of cooling a gas discharge tube wherein the air source is an on board fan, and that the fan cools not only the discharge tube, but also cools other internal components, adding to the overall lifetime of the entire device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to devise Applicant's method according to claim 9 (above), further comprising generating the flow of air by a central compressor, because these two cooling means are art-recognized equivalents. In the instant case, one of ordinary skill in the art would have found it obvious to substitute a fan for an air pump because both cooling means are capable of providing sufficient airflow to the gas discharge tube.

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. (USPN 5,086,255) in view of Ahonen (USPN 5,216,330).

In regards to claim 1, Okamoto teaches in figure 1 a gas discharge tube having an outer surface (element 70); an air passageway in contact with at least a portion of the outer surface of the gas discharge tube (element 60); an entry aperture for introducing air into the air passageway (element 51); and an exit aperture for allowing air to flow out of the air passageway (element

43). Okamoto further teaches in column 4, lines 3-14 that at least these elements are needed in order to efficiently cool the discharge tube using air.

Okamoto is silent to a specific type of air source for supplying a flow of air into the entry aperture for cooling the outer surface of the gas discharge tube.

However, Ahonen teaches in column 4 lines 33-39, a fan is mounted in a position so as to force cooling air down the outer surface of the gas discharge tube. Ahonen further teaches that there exists a need for being able to generate a plasma without the use of water-cooled coils, and also, air-cooling via a fan is a very practical method of cooling.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's air-cooled gas discharge detector comprising a gas discharge tube having an outer surface; an air passageway in contact with at least a portion of the outer surface of the gas discharge tube; an entry aperture for introducing air into the air passageway; an exit aperture for allowing air to flow out of the air passageway; and an air source for supplying a flow of air into the entry aperture for cooling the outer surface of the gas discharge tube, since it is well known in the art that this is a typical configuration of an air-cooled gas discharge tube. Further, it is well known that air-cooled gas discharge tubes are desired in different situations, i.e. when expensive liquid recirculation pumps are not the preferred mode of cooling.

In regards to claim 2, Okamoto in view of Ahonen teach all the recited limitations of Applicant's detector according to claim 1 (above). Okamoto further teaches in column 3 lines 45-67 that the plasma source is powered by microwave energy.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's air-cooled gas discharge detector according to claim 1 (above) further comprising the discharge powered by radio frequency or microwave energy, since it is well known in the art that a microwave generated plasma has more advantages than other plasmas, ex. Microwave generated plasma can be operated at an extremely high power and can be focused to produce an intense heat source.

4. Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. (USPN 5,086,255) in view of Ahonen (USPN 5,216,330) in further view of Holber et al. (USPN 5,625,259).

In regards to claim 3, Okamoto in view of Ahonen teach all the limitations of claim 2 (above).

Both Okamoto and Ahonen are silent to a magnetron tube.

However, Holber teaches in column 4 lines 47-56 that a magnetron generates the microwave energy required to create and sustain a plasma in the gas discharge tube.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 2 (above), further wherein the radio frequency or microwave energy is generated my a magnetron, since it is well known in the art that a magnetron reliably and efficiently generates microwaves for the entire lifetime of the magnetron, which is on the order of about 5000 hours.

In regards to claim 4, Okamoto in view of Ahonen in further view of Holber teach all the limitations of claim 3 (above).

Both Holber and Ahonen are silent to the radio frequency or microwave energy being introduced into a cavity defined by an inner wall, two sidewalls, and an outer wall, and wherein the inner wall surrounds at least a portion of the gas discharge tube.

However, Okamoto teaches in figure 1 that the radio frequency or microwave energy is introduced into a cavity defined by an inner wall, two sidewalls, and an outer wall, and also, the inner wall surrounds at least a portion of the gas discharge tube.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 3 (above), further wherein the radio frequency or microwave energy is introduced into a cavity defined by an inner wall, two side walls, and an outer wall, and wherein the inner wall surrounds at least a portion of the gas discharge tube, since it is well known in the art that the easiest and most effective method of introducing the microwave energy to the plasma gas is via the cavity recited in claim 4.

In regards to claim 5, Okamoto in view of Ahonen in further view of Holber teach all the limitations of claim 4 (above).

Okamoto further teaches in figure 1 and column 2 lines 25-30, that the air passageway extends alongside at least a portion of an exterior of the sidewalls, and that this configuration allows for effective cooling of the discharge tube, and also the helical coil.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 4 (above), further

wherein the air passageway extends alongside at least a portion of an exterior of the side walls, since it can be seen that this air cooling configuration will cool not only the discharge tube, but also any other internal component, which will consequently extend the overall lifetime of the detector.

In regards to claim 6, Okamoto in view of Ahonen in further view of Holber teach all the limitations of claim 5 (above).

Holber further teaches in column 4 lines 35-41, that the discharge tube is made of sapphire, which is substantially transparent to microwave energy and which also has suitable mechanical, thermal, and chemical properties for plasma processing.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 5 (above), further wherein the discharge tube is made of sapphire.

In regards to claim 7, Okamoto in view of Ahonen in further view of Holber teach all the limitations of claim 6 (above).

Ahonen further teaches in figure 2 wherein the air source is an on board fan, and that the fan cools not only the discharge tube, but also cools other internal components, adding to the overall lifetime of the entire device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 6 (above), further wherein the air source is an on board air pump, because these two cooling means are art-

recognized equivalents. In the instant case, one of ordinary skill in the art would have found it obvious to substitute a fan for an air pump because both cooling means are capable of providing sufficient airflow to the gas discharge tube.

In regards to claim 8, Okamoto in view of Ahonen in further view of Holber teach all the limitations of claim 6 (above).

Ahonen further teaches in figure 2 wherein the air source is an on board fan, and that the fan cools not only the discharge tube, but also cools other internal components, adding to the overall lifetime of the entire device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 6 (above), further wherein the air source is a central compressor, because these two cooling means are art-recognized equivalents. In the instant case, one of ordinary skill in the art would have found it obvious to substitute a fan for a central compressor because both cooling means are capable of providing sufficient airflow to the gas discharge tube.

5. Claims 15, 16, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. (USPN 5,086,255) in view of Holber et al. (USPN 5,625,259).

In regards to claim 15, Okamoto discloses all of the recited limitations of Applicant's detector according to claim 14 (above).

Okamoto is silent to the microwave power source being a magnetron tube.

However, Holber teaches in column 4 lines 47-56 that a magnetron generates the microwave energy required to create and sustain a plasma in the gas discharge tube.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 14 (above), further wherein the radio frequency or microwave energy is generated my a magnetron, since it is well known in the art that a magnetron reliably and efficiently generates microwaves for the entire lifetime of the magnetron, which is on the order of about 5000 hours.

In regards to claim 16, Okamoto in view of Holber teach all the limitations of claim 15 (above).

Holber further teaches in column 4 lines 35-41, that the discharge tube is made of sapphire, which is substantially transparent to microwave energy and also has exceptional thermal, mechanical, and chemical properties for plasma processing.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 15 (above), further wherein the discharge tube is made of sapphire.

In regards to claim 19, Okamoto in view of Holber teach all the limitations of claim 15 (above).

Okamoto further teaches in figure 1 that the radio frequency or microwave energy is introduced into a cavity defined by an inner wall, two sidewalls, and an outer wall, and also, the inner wall surrounds at least a portion of the gas discharge tube.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 15 (above), further wherein the radio frequency or microwave energy is introduced into a cavity defined by an inner wall, two side walls, and an outer wall, and wherein the inner wall surrounds at least a portion of the gas discharge tube, since it is well known in the art that the easiest and most effective method of introducing the microwave energy to the plasma gas is via the cavity recited in claim 19.

In regards to claim 20, Okamoto in view of Holber teach all the limitations of claim 19 (above).

Okamoto further teaches in figure 1 and column 2 lines 25-30, that the air passageway extends alongside at least a portion of an exterior of the side walls, and that this configuration allows for effective cooling of the discharge tube, and also if present, a helical coil.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 20 (above), further wherein the air passageway extends alongside at least a portion of an exterior of the side walls, since it can be seen that this air cooling configuration will cool not only the discharge tube, but also any other internal component, which will consequently extend the overall lifetime of the detector.

6. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto et al. (USPN 5,086,255) in view of Ahonen (USPN 5,216,330) in further view of Holber et al. (USPN 5,625,259).

In regards to claim 17, Okamoto in view of Ahonen teach all the limitations of claim 16 (above).

Ahonen further teaches in figure 2 wherein the air source is an on board fan, and that the fan cools not only the discharge tube, but also cools other internal components, adding to the overall lifetime of the entire device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 16 (above), further wherein the apparatus for air cooling the gas discharge tube includes an on board air pump, because these two cooling means are art-recognized equivalents. In the instant case, one of ordinary skill in the art would have found it obvious to substitute a fan for an air pump because both cooling means are capable of providing sufficient airflow to the gas discharge tube.

In regards to claim 18, Okamoto in view of Ahonen teach all the limitations of claim 16 (above).

Ahonen further teaches in figure 2 wherein the air source is an on board fan, and that the fan cools not only the discharge tube, but also cools other internal components, adding to the overall lifetime of the entire device.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct Applicant's detector according to claim 16 (above), further wherein the apparatus for air cooling the gas discharge tube includes a central compressor, because these two cooling means are art-recognized equivalents. In the instant case, one of

ordinary skill in the art would have found it obvious to substitute a fan for an air pump because both cooling means are capable of providing sufficient airflow to the gas discharge tube.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (703) 305-7198. The examiner can normally be reached on 7.30 - 4:30, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703) 305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

pjm
September 27, 2002

Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800